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responding increase of any particular species of noxious insects. That is a point for the entomologist to decide for us.

What comparatively few birds are gathered in for scientific purposes, I am strongly of the opinion, has but very little influence either one way or the other upon bird increase or decrease. Take a city like Chicago, for example, and its extreme suburban environs; how few, indeed, in proportion to her population, are there of her inhabitants who collect in the neighborhood birds for scientific purposes! In the course of a collecting season how many young scientific ornithologists in Chicago go out into her suburbs to collect birds? Not in any sufficient numbers, I warrant, to have any material effect upon the decrease of native birds. The same suggestion is applicable to other large towns and cities in the United States and Territories. When one comes to think of the millions of birds that pass over the country during the vernal or autumnal migrations *every year*, and then come to compare that host with all that has been deducted from it during the last century, as represented by all the birds actually existing in scientific collections, the loss is hardly worthy of mention. Moreover, more than half of our scientific avian collectors do not collect in the suburban districts but go far from the habitations of men, and so their work cannot be said to affect the question at all.

But there is a cause in my opinion, however, for the scarcity of our native birds in and about cities and large towns of this country, before which all other reasons we have mentioned stand absolutely aghast. It is the wholesale destruction carried on by the army of unscrupulous small boys in any particular place. I am the more convinced of this from my observations in and about Washington, D. C., during the past four years. This active destruction has been made possible by the numerous comparatively recent and cheap inventions in the way of air and spring-guns, as well as cheap rifles of small calibre, also other fatal contrivances that will noiselessly throw missiles of a variety of kinds with great accuracy. Hundreds of those guns are sold annually to boys, and the latter never seem to tire of strolling about orchards and hedge-rows and knocking over dozens upon dozens of birds with them. One day last spring I met one such youngster, and upon examining his game-bag found it absolutely crammed full of dead birds which he had killed since starting out in the morning. One item alone consisted of seventy-two ruby and golden-crowned kinglets. The same fellow boasted of having slain over one hundred cat-birds that season. Boys get to be wonderfully expert shots with the kind of guns to which I refer, and as the ammunition costs little or nothing, and a great quantity can be carried at a time, it is easy to be seen that between the wholesale slaughter they can and do commit, in addition to keeping the remaining birds perpetually alarmed, it is no wonder that they are soon driven away from the neighborhood of our cities and country seats.

There are ample legal measures within our power to enforce, to prevent this cause of bird decrease, especially if the fathers of those boys are held responsible, and I would suggest that it be the sense of this congress that such measures will be recommended to the various State legislators hereafter that will have the tendency to thoroughly discourage such practices.

A NEW THERMOELECTRIC PHENOMENON.

BY W. HUEY STEELE, M. A., MELBOURNE UNIVERSITY.

It is stated in many text-books, and pretty generally known, that electric currents may be produced by heating

a single metal, if there be any variation in temper, or if the distribution of heat be very irregular and the changes of temperature abrupt. These effects are generally supposed to be exceedingly small compared with ordinary thermoelectric effects, but some experiments performed by the writer in the Physical Laboratory of the University of Melbourne show that at high temperatures these effects are sometimes exceedingly large, as great or greater than that given by a junction of antimony and bismuth at the same temperature. At low temperatures this is most apparent in iron wires, iron being the only metal in which I could observe the effect at a temperature below 100°C. If a piece of iron wire be put in circuit with a very sensitive galvanometer and gently heated irregular currents will flow, sometimes one way, sometimes the other, rising and falling in an apparently arbitrary manner. I several times observed the effect simply by warming the wire with my fingers. At a red heat the effect is much more marked and also much more irregular. The effect in iron, however, is not so great as in some other metals at a high temperature, the highest effect I observed in it being .002 volt. Altogether twelve different metals and four alloys were examined and the effect noticed in each of them. In order to raise them to a high temperature without breaking circuit by their fusing I put them through clay tubes (tobacco pipe stems), and when examining metals with low melting points I completely filled up the tube with the metal. A tube of lead when heated gave, after a little irregular heating, .3 volt, and another, with a lead wire passed through it and heated about the middle, gave about half that amount, but in this case there was no irregular or unsymmetrical heating. The effects are not always steady, in fact they very seldom keep steady, but they may be observed with certainty by filling a tube with lead and raising it to a red heat in a Bunsen flame. The effect may also be observed very easily in fine gold wire, but it does not last so long as that in lead, which shows no sign of ceasing after an hour's or half a day's heating. With gold I observed a higher effect than with any other metal, once observing nearly half a volt. .3 volt was observed with six different metals—lead, copper, gold, tin, zinc and antimony, while, with others, *e. g.*, silver and aluminum, though I could certainly observe the effect, it was exceedingly small. Sometimes when a metal is heated thus the changes in the electromotive force generated are slow and gradual and at times scarcely perceptible, while at others they are rapid and sometimes apparently instantaneous at a time when the temperature is perfectly steady and nothing is apparent which could cause the changes. Another curious effect is that sometimes when the temperature is falling, after the gas has been turned down or put out, there are rises, generally sudden, in the *e. m. f.*, this was chiefly noticed in lead. These phenomena are generally quite sufficient to mask the ordinary thermoelectric effect at a red heat, and thermoelectric tables are consequently quite unreliable for high temperatures.

CURRENT NOTES ON ANTHROPOLOGY.—NO. XXXIV.

(Edited by D. G. Brinton, M. D., LL.D., D.Sc.)

BASTIAN ON BUDDHISM AND THE PLACE OF DEPARTED SOULS.

RELIGIONS, like all other expressions of human intelligence, will ultimately come under a rigid scientific examination at the hands of anthropologists, and the laws of their growth and change will be determined without respect to the clamors of their votaries. Of all religions, that which certainly occupies the most territory in the Old World and perhaps has the greatest number of believers is Buddhism. It has recently attracted the attention of several of the ethnologists of Europe, among them

Dr. A. Bastian, the eminent Director of the Museum of Ethnology in Berlin, who has made it the subject of a lecture (*Der Buddhismus als religions Philosophisches System; Berlin, 1893*). As he but recently returned from the Orient, where he had unusual opportunities to study this faith in situ, his opinions are as fresh as they are profound.

Another of his lectures, published like the former with considerable additions, is upon the notions which have prevailed the world over as to the place of departed souls (*Die Verbleibs-orte der Abgeschiedenen Seele*). It illustrates with curious richness of learning the endless variety of the pictures the living have drawn concerning the fate of the soul after its departure from the body, some of the crudest being by no means confined to savage tribes.

Both lectures witness to the astonishing erudition of the author; but it is to be regretted that his style offers such difficulties to the foreign reader, and that his system of references is so vague.

CENTRAL AMERICAN ETHNOGRAPHY.

Geographically, Central America should be held to include all the area between the isthmus of Tehuantepec and that of Panama. Using the term in this sense, I believe that no new linguistic stock remains to be discovered there; though, it is true, of some we have very little material, and of a few tribes we have not positive knowledge. The most important of these is the Guetares or Huetares, who lived near Cartago in Costa Rica, and who seem now to be extinct. Señor M. de Peralta prepared in connection with the Madrid exposition an excellent resumé of the ethnography of that state, and this was the only problem he left unsolved (*Etnografía de la Republica de Costa Rica, Madrid, 1893*).

Recently, Dr. C. Sapper, of Guatemala, wrote to me that he had found an unclassified tongue spoken by a few old people at Tapachula, in Chiapas, close to the western boundary of Guatemala. At my request he kindly sent me a short vocabulary; but he himself had already by that time noted its resemblance to the Zoque-Mixe family, of which it unquestionably is a member, though the presence of this stock in that part of the map had not previously been noted.

There is a very prevalent error that the Caribs had settlements in Central America. I observe it in the notes to Quaritch's edition of the voyages of Amerigo Vespucci, and elsewhere. It is certain they had not. No Carib dialect has been found anywhere above the isthmus of Panama. The Caribs of Honduras and Belize have been brought there since the conquest.

ANTHROPOLOGY IN THE UNITED STATES SEEN WITH FRENCH EYES.

Last spring Dr. Paul Topinard, the well-known editor of *L'Anthropologie*, made a rapid tour over the United States, and on his return promptly gave his readers his scientific "impressions de voyage" under the title "*L'Anthropologie aux Etats Unis*".

He considers first the domain of physical anthropology, to which he assigns a rather erroneous history. It is totally misleading to say Aitken Meigs (whose name he spells *Miegg*) "continued Morton"; the fact being that he reversed Morton's most important deductions. It is equally erroneous to date the study of the ethnography of the native race of the United States from the organization of the Bureau of Ethnology in 1879. Long before that, the labors of Gallatin had laid a broad foundation, on which many solid superstructures had been erected. More amusing is the reference to the serpent-mound of Ohio as "discovered by Mr. Putnam", which indicates that Professor Topinard had looked more at our collections than our libraries; though he does mention the work of Squier and Davis, assigning its publication, however, a wrong date, 1840, instead of 1848.

M. Topinard writes at considerable length on the palæ-

olithic question in American archæology, and on the origin of the American race. He seems inclined himself to believe that the American race, like Topsy, "just grewed" here, and later became more or less modified by immigrations from Asia. He is, therefore, perfectly willing to accept the discoveries of implements in the Trenton gravels as palæolithic, and immediately post-glacial, if not glacial; but considers them far ante-dated by those obtained by Dr. Hilborne T. Cresson from the Columbian gravels near Claymont; "but," he exclaims, "while the glory of this proof remains with Mr. Cresson, it does not diminish that of Dr. Abbott, who remains the Boucher de Perthes of North America!". In the "fight", therefore, over palæoliths, "rejects", and the like, our visiting scientist sides with Messrs. Wilson, Putnam, Wright and Abbot, and affiliates not with the camp of the enemy.

It is a pity that the Professor, who came over to see the Chicago Exposition, departed before the opening of the Anthropological Department; and that he did not remain to the meetings of the American Association at Madison and the Congress of Anthropologists at Chicago. It is likely that he would have materially modified much that he has written, had such been the case.

A CONTRIBUTION TO PERUVIAN MYTHOLOGY.

One of the most interesting fragments of the ancient mythology of Peru is that preserved by a native, Joan de Santa Cruz Pachacuti, with reference to the hero-god Tonapa. Though written early, it was first published at Madrid in 1879. The author was more fluent in his native Kechua than in Spanish, and his construction is often awkward. In some paragraphs he inserts the original prayers and invocations without translations, and when he does give these, his knowledge of Spanish was too limited to be accurate.

In a work published some years ago ("American Hero-Myths") I analyzed this myth, and reached the conclusion that it belonged to the cyclus so common among native American tribes which describes the advent of the fair-hued light god, and the benefits which he brings to his people. Last year, without knowledge of my previous study, Sr. S. A. Lafone-Quevedo of the Argentine Republic, published a very thorough examination of the story in the *Revista del Museo de la Plata*, under the title "*El Culto de Tonapa*"; and I am glad to say, reached substantially the same conclusions. He also adds full and careful translations of the Kechua prayers and chants in Pachacuti's narrative, having had the advantage of the assistance of Sr. Mossi, cura of a parish among the Kechuas, and thoroughly familiar with their tongue.

He also is inclined to the belief that the myth of the Tonapa, along with many of the rites connected with it, may have been borrowed by the Kechuas from the Aymaras; in which he coincides with what I had expressed. But in his endeavors to trace a linguistic connection of "Tonapa" with the Nahuatl "Tonatiuh", and of the "Con" of the Kechuas, an important divinity, with the "Canob" of the Mayas of Yucatan, he is certainly led astray by mere phonetic resemblances which mean absolutely nothing. There is not the slightest evidence either in language, history or archæology, that the great Peruvian culture of the south either borrowed from, or loaned to, that of Central America. They appear to have been wholly independent centres of civilization.

—Dr. J. Christian Bay has resigned his position at the Missouri Botanical Gardens, St. Louis, Mo., and accepted the position of bacteriologist of the State Board of Health, Ames, Ia.

—Oscar Clute, M. S., LL.D., resigned his position of president of Michigan Agricultural College and Director of Agricultural Experiment Station to take the same position in the Florida Agricultural College Sept. 5, 1893.